A COMPARATIVE STUDY OF NON-PERFORMING ASSETS (NPAs) IN PUBLIC, PRIVATE AND FOREIGN BANKS IN INDIA [WITH A FOCUS ON ROLE OF ARTIFICIAL INTELLIGENCE (AI)]

A

Synopsis

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AAKRITI SHARMA

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PROF. PRAMOD KUMAR

DEPARTMENT OF ACCOUNTANCY & LAW, FACULTY OF COMMERCE

DAYAL BAGH EDUCATIONAL INSTITUTE (DEEMED UNIVERSITY)

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INTRODUCTION

In the modern economic of different countries the bank plays a vital role for their development. Across the global the bank is taken as the life blood or as the backbone of the economy in which the banking sector provide the financial benefits or the financial resource to all the sectors that need the finance by which the country get economic development and growth of the country. In India banking system is two centuries old. The primary function of the bank is to provide funds as a loan to different sectors such as industries, agriculture, personal and housing loan etc. and receive deposits(as a saving). The banks convert these deposits or savings into investment by allocating these savings to the different sectors. The process of conversion of savings in to investment is known as the capital formation in the economy. This process of collecting of scattered savings and using it into productive purposive reflect the efficiency of the financial institutions. There is no risk involved in receiving of deposits, so it is the duty of the bankers who owes to repay the deposits whenever demanded by the depositors. But on the other hand providing loans are always involves much risk because there is no certainty that they repay it timely. Now a day's banks become careful while providing loans, the reason behind this is being rising of Non-Performing Assets. Non-Performing Assets is the major problem which is poses challenge to their ultimate survival.

CONCEPT OF NON-PERFORMING ASSETS

Non-Performing Assets (NPA) concept was introduced by the Narasimham Committee (1991) on "Financial System Reforms". The Non-Performing Assets develops the best indicator of judging the health of the banking sector. An Asset including a leased Asset when it stops generating income for the bank it becomes Non-performing. A Non-Performing Assets is defined as if an interest on installment of principal due remains unpaid for more than 90 days. In simple word it can be said that bank provide the credit in the form of loan and advances to different sectors of the economy but sometimes unfortunately bank does not get back the principal amount of the credit and interest from borrowers within a 90 days and it became a bad debts and this as known as Non-performing Assets of bank. NPA reflect the performance of the banks means that higher level of NPA means high probability of credit defaults which adversely affect the profitability and net worth of the banks. In recent time increase in NPA is critical issue in Indian

banking sectors because banks face different problems like declining, profitability, liquidity problems and reducing in capital Assets and lending limits.

Thus the Non-performing Assets (NPA) is a loan or an advance where:

- Interest and/ or installment of principal remain overdue for a period of more than 90 days in respect of a term loan,
- The account remains 'out of order' in respect of an Overdraft/Cash Credit (OD/CC),
- The bill remains overdue for a period of more than 90 days in the case of bills purchased and discounted,
- The installment of principal or interest thereon remains overdue for two crop seasons for short duration crops,
- The installment of principal or interest thereon remains overdue for one crop season for long duration crops,
- The amount of liquidity facility remains outstanding for more than 90 days, in respect of a securitization transaction undertaken in terms of guidelines on securitization.
- In respect of derivative transactions, the overdue receivables representing positive mark-to-market value of a derivative contract, if these remain unpaid for a period of 90 days from the specified due date for payment.

ASSETS CLASSIFICATION AND PROVISIONS

Banks are required to classify NPAs into three categories which are based on the period for which the Assets have remained Non-Performing Assets:

- Sub-Standard Assets;
- Doubtful Assets; and
- Loss Assets

Substandard Assets: - With effect from 31 March 2005 a sub-standard Assets would be one which has remained NPA for a period less than or equal to 12 months. In such cases, the current net worth of the

borrower guarantor or the current market value of the security charged is not enough to ensure recovery of the dues to the banks in full.

Doubtful Assets: - With effect from March 31, 2005 an Assets would be classified as doubtful if it remained in the sub-standard category for 12 months.

Loss Assets: - Where loss has been identified by the bank or internal or external auditors or the RBI inspection but the amount has not been written off wholly or such an Assets is considered uncollectable and of such little value that its continuance as a bankable Assets is not warranted although there may be some salvage or recovery value.

Measurement of Non-Performing Assets:

Non-performing Assets is measured in two categories which are as:

- Net non-performing Assets
- Gross non-performing Assets

It is calculated as under as per RBI formula

$$\frac{\textbf{Specific provisions for NPAs held/required} + \textbf{Provisions for diminution in fair value of the restructured accounts classified as NPAs} + \textbf{Technical write} - \textbf{off}}{\textbf{Gross NPAs} + \textbf{Technical/Prudential Write off}} \textbf{X 100}$$

Gross NPAs = Principal dues of NPAs plus Funded Interest Term Loan (FITL) where the corresponding contra credit is parked in sundries account (interest capitalization – Restructured accounts), in respect of NPA accounts.

NET NPA = Gross NPA – (Balance in interest suspense account + DICGC / ECGC claims received and held pending adjustment + Part payment received and kept in suspense account + Total provisions held).

Artificial Intelligence:

Artificial Intelligence (AI) refer that a machine in that which stimulation of human intelligence which are programed to think and do action like humans. It can be said that it is a revolutionary feat of computer science which set to become a core component of all modern software over the coming years and decades. AI programming mainly focuses on three cognitive skills: learning, reasoning and self-correction.

Learning processes: It focuses on acquiring data and creating rules for how to turn the data into actionable information.

Reasoning processes: It focuses on choosing the right algorithm to reach a desired outcome.

Self-correction processes: It is designed to continually fine-tune algorithms and ro ensure they provide the accurate results possible.

REVIEW OF LITERATURE: The review of literature provides the glance of the earlier studies of the particular arena, and also provides the direction to know in which or what to do in the research. It is the comprehensive summary of the previous research on the topic. There are studies published on Non-Performing Assets (NPAs) by focusing on the various aspects of Non-Performing Assets, identifying the factors attributed of NPAs measures and steps to reduce the NPAs in the banks.

TABLE-1 INTERNATIONAL REVIEW

S.No.	Author name	Year	Topic	Objectives	Findings
1.	P Numer , P Devika	2019 International Journal of Scientific and Research Publications.	A Study on Comparative Analysis of Non-Performing Assets in Selected Private Sector Banks.	To study the comparative analysis of NPAs of selected banks, To study the trend of Gross NPA and Net NPA of Selected Banks in India and to measure the effect of NPAs in selected banks.	Through the study, it was concluded that indusind Bank is having positive growth in Net Profit as well as growth in NPAs which is not affecting the banking performance when comparing with other two banks.
2.	Jagbir Ahlawat , Punam Ahlawat	2019 International Journal of Management , IT & Engineering.	A study of Non-Performing Assets of Commercial banks in India.	In this paper an attempt is made to understand NPA factors contributing to NPAs, reasons for high impact of NPAs on commercial bank in India, the status and trend of NPAs in Indian Scheduled commercial banks, the factors contributing to	The study reveals that there are several internal factors such as weak credit appraisals non-compliance to the leading norms and willful default that contribute to high NPA.

				NPAs.	
3.	Harendra Singh, Anil Vashisht	2019 International Journal of Research in Advance Technology.	Credit Risk management in Banking Sector: A comparison of Non-Performing Assets of Public sector and Private sector Bank	The objective of the study was to identify the factors affecting the NPAs, the reasons for increasing NPAs, the tools and techniques used for managing such NPAs and making a comparison between the NPAs of the top 5 public sector banks and private sector banks.	They conclude that there was no significant difference between the public and private sector banks with respect to the NPAs and the banks use the common tools and techniques used to reduce it.
4.	Jagadish Biradar	2019 Journal of Business and Management .	The Problem of Rising Non-performing Assets in Banking Sector in India: Comparative Analysis of Public and Private Sector Banks	To find out the quantum of NPAs in public sector and private sector banks in India, to analyze the impact of NPAs on banks' performance, to analyze the reasons for mounting NPAs in banks in India and to suggest ways to reduce the level of NPAs in banks in India.	The study reveals that the extent of NPAs is comparatively more in public sector banks compared to private sector banks. The government is taking many steps to reduce the problem of NPAs but banks should also have to be more proactive to adopt a structured NPAs policy to prevent the Non-Performing Assets and should follow stringent measures for its recovery and Bankers should also consider the ROI on a proposed project and provide loans to customers who have better credit worthiness as prevention is always better than cure.
5.	Tushar Patil, Prof. Sagar Sutar	2019 International Journal of	Non-Performing Assets: A Study of Shree Warana Co-	To understand the meaning and nature of NPA, to examine	It is found that the loans and advances are increasing trend

		Trend in Scientific Research and Development.	operative Bank Ltd. Warananagar	the causes for NPAs in bank and to study the NPA position of five branches (2013-14 to 2015-16).	of Warananagar & Vadgaon branch. The loans and Advances provided by kodoli branch was constant in the year 2013-14 to 2014-2015 and increased in the year 2015-16.The amount of loans and advances are not Constant and changing every year of Paragon & kini branch. The overall Gross NPA of bank has been increased and that is not good for the bank.
6.	G. Sathish	2019 International journal of advanced research in management engineering technology.	Non-Performing Assets (NPAs): A Challenge for Dindigul Urban Cooperative Bank	To analyze the trend of Gross NPA and Net NAP in Dindigul UCB, to analyze the trend of priority sector and Non-priority sector in Dindigul UCB and to analyze the level of NPA priority and Non-priority sector of Dindigul UCB.	The study found out that the share of non-priority sector in total NPAs has exceed the Priority sector and the increase of NPA is sometimes due to the lack of technology, lack of efficiency of staff and at other time due to willful defaulters
7.	S. Ragini1 and Chandra Sekhar Yalamarthi 2	2019 International journal of advanced research in management engineering technology.	A Study of Non-Performing Assets of Commercial Banks and Its recovery in India	This paper aims to understand NPA, the status and trend of NPAs in Indian Scheduled commercial banks, The factors contributing to NPAs, reasons for high impact of NPAs on Scheduled commercial banks in India and recovery of NPAS through various channels.	This study shows that extent of NPA is comparatively very high in public sectors banks. Although various steps have been taken by government to reduce the NPAs but still a lot needs to be done to curb this problem, the NPAs level of our banks is still high

					as compared to the foreign banks. It is not at all possible to have zero NPAs.
8.	C.Vijai.	2019 International Journal of Advanced Research	Artificial intelligence in Indian banking sector: challenges and opportunities.	In this paper they discuss how Artificial Intelligence is used in the Indian banking sector, what are the benefits and what are the challenges facing India‘s Artificial Intelligence.	Artificial intelligence is changing business processes and customer-facing services in t he banking sector i n India and it is also being used to meet regulatory compliance, detect fraud, and assess individual credit worthiness.
9.	Sanjay Dawn, Subhas Chandra Sarkar	2018 International Journal of Trend in Scientific Research and Development .	Impact of NPAs on the Performance of UCO Bank: A Study	To analysis the NPAs of UCO Bank and evaluate the impact on NPAs on the performance of UCO Bank and the recovery performance of NPAs of UCO Bank.	This study shows that the money blocked in NPAs of UCO Bank is very high and its affects the profitability, liquidity and involvement of management adversely.
10.	R.Perumal, P.Anilkum ar	2018 International Journal of Management .	NPA Management in Banks: An Indian Perspective	The paper manages understanding the idea of NPAs, its extent and real reasons for a record getting to be non-performing and furthermore techniques for diminishing NPAs.	It reveals that there is a positive relative between Net Profits and NPA means that as profits increase NPA also increase. NPA is directly related to Total Advances given by bank and banks main source of income is interest earned by a bank. But other banks are a negative correlation. NPAs are increasing in every year but net profit decrease.
11.	Veena K. P., S. N. Pathi	2018 International Journal of	Pre and Post Merger Analysis of Non Performance	The main objectives of the study are to understand the	The overall analysis showed that post-merger

		Management Studies	Assets (NPAs): A Study with Special Reference to ICICI Bank Ltd	various concepts of NPAs and RBI guidelines for Non-Performing Assets. And to trace out the pre and post-merger analysis of gross NPAs to gross advances and net NPAs to net advances and to analyze the pre and post-merger in the classification of loan Assets and also to examine the pre and post-merger analysis in movements of gross and net NPAs of ICICI bank	NPAs performance was better and good compared to the pre-merger NPAs performance of ICICI bank. Therefore magnitude of NPA is comparatively higher in banking sector and it improves the efficiency and profitability of banks the NPA need to be reduced and controlled. In this paper, an effort has been made to analyze the pre and post-merger analysis of Non-Performance Assets of the ICICI Bank.
12.	Anilkumar Nirmal	2018 International Journal for Scientific Research & Development.	Banks NPAs & use of Artificial Intelligence to Manage.	To, Study the problems of NPAs in the Indian Banking System, Use of artificial intelligence in the data analysis and managing NPAs and Use of technology in reducing the cost of the banks while reducing NPAs.	Recovery of NPAs or Disbursement of loans by using RPA will reduce the manpower's errors and ensure the profitability and productivity for the banks, by using technology banks can identify the root cause and so they can offer the flexible solution to the customer and reduce the chances of becoming it NPAs.
13.	P. Selvarajus	2018 Asian Journal of Managerial Science	Non-Performing Assets (NPAs) of Urban Co-operative Banks (UCBs) in Coimbatore District of Tamil Nadu: An Empirical Study	The core objectives of this empirical study to bring the real status and conditions of Non-Preforming Assets in Urban Co-operative Banks in Coimbatore District	An attempt has been made to give A Conceptual Framework on Non-Performing Assets (NPAs) with Special reference to Urban Cooperatives banks

				of Tamil Nadu. Further, the study can explore the factual outlook and effects of the same on different heads such as Assets classifications (Standard Assets, sub-standard, Doubtful Assets 1(D1),D2 and D3 Assets, Loss Assets, Sector-wise analysis, Gross and Net NPAs etc.	in India. In this situation, the mounting and level of NPAs in Urban Co-operative Banks in Coimbatore District are in higher nature and same trend must be monitored and reduced tremendously for the wellbeing of the banking operations.
14.	Ashok Kumar Gupta , Priyanka Gautam	2017 International journal of science technology and management.	Non-performing Assets (NPAs): a study of Punjab national bank.	To analyze the sources and deployment of funds of PNB, to examine the trend of NPA in PNB and to investigate the impact of NPAs on profitability of PNB.	It finds that level of NPAs both gross and net is increasing trend. It also finds that there is a negative relationship between Net profits and NPA of PNB. This is 704 | P a g e because of mismanagement and wrong choice of client. To improve the efficiency and profitability, the NPA has to be reduced further.
15.	Kumar Thammana veni	2017 International journal & magazine of engineering technology, management and research.	A Study of Non-Performing Assets of Commercial Banks and its Recovery in India.	To study the status of Non-Performing Assets of Indian Scheduled Commercial Banks in India, to study the impact of NPAs on Banks and to know the recovery of NPAS through various channels.	This study shows that extent of NPA is comparatively very high in public sectors banks. Although various steps have been taken by government to reduce the NPAs but still a lot needs to be done to curb this problem. The NPAs level of our banks is still high as compared to the

					foreign banks.
16.	Krishna banana, v.rama krishna rao chepuri	2017 International journal of research culture society.	A study on Non-Performing Assets of Indian commercial banks.	To study the progress of Gross & Net advances of Commercial Banks and To study the changes in Non-Performing Assets of Commercial Banks.	The study revealed that the growth rate in advances is decreasing and growth rate in Non-Performing Assets is increasing, which is not desirable to the bank.
17.	C K Goyal, Gagan Bhati	2017 International Bulletin of Management and Economics.	Determinants of Non-Performing Assets: An Empirical study of Public Sector Banks in India.	To Study the Impact of selected Macroeconomic and Bank specific variables on NPA of Public Sector Banks in India and to Study the trends of NPAs in Public sector Banks in India during the study period.	It was found that GDP at factor cost has a positive and significant impact on the level of Net NPA, exchange rate has also positive significant impact on the Net NPA of Indian PSU banks.
18.	Munish Sabharwal	2014 International Journal of Artificial Intelligence and Agent Technology	The use of Artificial Intelligence (AI) based technological applications by Indian Banks	The main objective of this research paper is to observe whether the selected Indian Banks are using Artificial Intelligence based technological application or not and if the banks are using AI based applications, then what are different the purposes for which they using them.	The research clearly suggests that none of the banks selected by the researcher in his research except the new private sector banks use artificial intelligence based technological applications.
19.	Krishna Murari	2014 Asian Journal of Research in Banking and Finance	Comparative Evaluation of Non-Performing Assets of Indian Banks: A Study of Public and Private Sector Banks	To highlight the NPA position of selected public and private sector banks, to find the trend in NPAs of the aforesaid categories of Indian banks, to assess the comparative position of NPAs in public and private sector categories of	The study further reveals that despite the huge NPA level of public sector banks, they have been successful in reducing their respective gross and net NPA ratios at par with the private sector banks.

				Indian banking	
20.	Pach Malyadri	2011 International Journal of Economic Practices and Theories	A comparative Study on NPAs in India banking Industry.	The objective is to analyze NPA in weaker sections of public Sector banks and private sector banks specifically in India.	The study observed that there is increase in advances over the period of the study. However, the basis of analysis that there is significant improvement in the management of NPAs of the public sector banks in India.

TABLE-2 NATIONAL REVIEWS

S.N.	AUTHOR NAME	YEAR	TOPIC	OBJECTIVE	FINDINGS
1.	Noor Ulain Rizvi, Smita Kashiramka, Shveta Singh & Sushil	2019 Applied economics	A hierarchical model of the determinants of nonperforming Assets in banks: an Interpretive Structural Modeling (ISM) and Cross-Impact Matrix Multiplication Applied to Classification (MICMAC) approach	To identify the determinants of NPAs, to identify the interrelationships among the determinants by building on the knowledge of experts taking a case of India, to classify the determinants on the basis of their driving power and dependence power, and to find out the most influencing factors.	The study reveals that the broad economic-political environment is the main driver of NPAs that enhances the factors such as adoption of international best practices and affects the ownership pattern, among others. It also identifies three crucial paths that need to be stressed upon.
2.	Pallavi Singh Yadav, Raj Kumar Thathera	2019 Think India journal	Impact of Non-Performing Assets (NPAs) on Assets Turnover Ratios of Punjab National Bank Limited	To study the composition of the Assets of Punjab National Bank Limited, to calculate, analyze and interpret the Assets turnover ratio of Punjab National Bank Limited, to evaluate the impact of non-	The performance of Punjab National Bank Limited considering the non-performing Assets is not the same or equal and it shows a mixture of sudden increased and decreased during the study. The high level of non-performing Assets puts pressure

				performing Assets on Assets turnover of Punjab National Bank Limited and to provide valuable suggestions for reducing the level of non-performing Assets in Punjab National Bank Limited.	on the recycling of the funds of the bank and forces the bank to reduce their ability of lending and the result is low interested income, which slowdowns the bank profitability and may lead to the economics low down.
3.	Subhas Chandra Sarkar, Dilip Kumar Karak	2018 Indian Journal of Accounting.	Management of non-performing Assets of district central co-operative bank.	The main objective of this study is to analysis the trend of NPAs of BDCCBL operating in the district of Burdwan, West Bengal in terms of physical and financial indicators.	It is observed that there exist a high positive correlation between actual values and trend values of NNPA to Total Assets. It is also observed that the actual and trend values are not correlated. The overall picture of NPA management is not satisfactory of the bank under the study. This is, perhaps, due to improper management of NPAs, i.e., decrease in the recovery rate and or increase in addition to NPA in any reasons.
4.	Amarjit singh sethi , anu bajaj	2018 Finance India	Non-Performing Assets (NPAs) of Scheduled Commercial Banks (SCBs) in India : Analytical Revelations	This paper makes certain analytical revelations in respect of NPAs of the SCBs in India in respect of the extent of instability along the growth path; temporal narrowing down of inter-bank gaps; and structural changes in the functional relationships of NPAs with size of the banks.	As per the main findings, the Assets quality of all types of Indian SCBs has turned sour fairly rapidly after global financial crisis of 2008-09. As per convergence analysis (both unconditional and conditional), inter-bank gaps have temporally narrowed down, so far as the severity of their bad loans is concerned, although the extent of

					dispersion has not declined.
5.	Shaken Srivastava and Pratapsinh Chauhan	2018 Indoor management journal	Institutional Factors influencing Non-Performing Assets (NPA) in Indian Banking Sector and use of Artificial Intelligence as a remedial tool	To study the institutional bank specific factors (at each stage of loan delivery mechanism) resulting in rise of NPAs in Indian Banking Sector and to suggest remedial mechanisms /strategies of how Artificial Intelligence (AI) technologies and Big Data Analytics can help in faster resolution of Non-performing Assets.	In this paper, most of the issues of handling NPA Management can be handled using AI and Big Data Analytics, which will help in strengthening balance sheets of banks and further enhance credit quality. In global context, many banks have already started using AI and Data Analytics for Risk management and Fraud detection, which has not only reduced the level of rising NPAs but also improved identification of creditworthy customers to create a foundation of a good loan profile.
6.	Preeti Sharma	2017 University of Engineering & Management, Jaipur	A study of non-performing Assets management with reference to select Indian public sector banks and private sector banks.	The objective of the study was An overview of NPA, various types of NPA and its cause, Considering the aggregate data of select public sector and private sector banks and attempts to compare analyze and interpret the NPA management from the year 2010 -2015.	The findings reveals the percentage of Gross NPA to Gross advances is increasing for public banks, the Estimated Gross NPA for 2014-15 is also more in public banks as compared to private banks and from the ANOVA test, it is concluded Ratio of Gross NPA to Gross Advances for public sector and private Sector Banks does not have significant difference between 2010 to 2015.
7.	Ravindra Tripathi, aamiraijaz	2017 Indian journal of commerce	Study of NPA trend and Basel norms: statistical	This paper tries to analyze the current situation of	From the above analysis it has been seen that

	Syed	and management studies.	evidences.	Nonperforming Assets of Indian Banking Industry and also tries to show the capital to risk weighted Assets guidelines of Basel and its effectiveness on the NPA reduction of Banking Industry.	NPA problem is conti nuously rising over th e years this is generally because banks are more focused on volume of credit so to show a rosy picture of their balance sheet rather than focusing on the quality of Assets.
8.	Jai Prakash Tripathi, Ravindra Kumar Kushwaha, Mr Satish Mewada	2016 Journal of Business and Management	A Comparative Study: NPA's in Indian Banking Industry	To study Comparison between Nationalized banks and State bank Group NPAs relating to weaker area, to examine the Comparison between Old private part banks and New private area banks NPAs relating to weaker segments	It is found on the premise of examination of information that the advantage nature of open part banks and private segment banks enhanced reliably in the previous couple of years as reflected in the decrease in the proportion i.e. NPAs as rate of advances to weaker areas from 18.9% to 3 percent if there should be an occurrence of open part banks and from 12.15percent to 0.5 percent
9.	Vivek Rajbahadur Singh	2016 Annual Research Journal of Symbiosis Centre for Management Studies, Pune	A Study of Non-Performing Assets of Commercial Banks and it's recovery in India	To study the status of Non-Performing Assets of Indian Scheduled Commercial Banks in India, to study the impact of NPAs on Banks and To know the recovery of NPAS through various channels.	This study shows that extent of NPA is comparatively very high in public sectors banks. Although various steps have been taken by government to reduce the NPAs but still a lot needs to be done to curb this problem.
10.	Mohammad vasimranav adiya, .sunilshah	2016 Indian journal of research	Comparative Analysis of Non - Performing Assets(NPA) of The Sarvodaya Nagrik Sahakari Bank Ltd. & The	To compare the analysis of "Non-Performing Assets of The Sarvodaya Nagrik Sahakari Bank Ltd & The Mehsana Urban	The MUCO-OP BANK has given more loan as compare SNSB than after MUCO-OP BANK Gross NPAs ratio low because the

			Mehsana Urban Co-Op. Bank Ltd.	Co-Operative Bank Ltd.	MUCO-OP BANK take strict steps regarding recovery of loan as compare to SNSB The Gross NPAs ratio of SNSB is 4.94% as compare with Gross NPAs ratio of MUCO-OP BANK is 1.70%.
11.	Meenakshi Rajeev H P Mahesh	2010 The Institute for Social and Economic Change, Bangalore	Banking Sector Reforms and NPA: A study of Indian Commercial Banks.	This exploratory paper examines the trends of NPAs in India from various dimensions and explains how mere recognition of the problem and self-monitoring has been able to reduce it to a great extent.	The problem of NPA has received considerable attention after the liberalization of the financial sector in India. Accounting norms have been modified substantially and mechanisms are in place for reduction of bad loans. There discussions with banks, however, show that such decline is mainly due to the awareness of the problem of bad loans at the bank level.

NEED OF THE STUDY (RESEARCH GAP): The non-performing Assets is not only problem for bank, but also bad for the economy of the country. Non-performing Assets (NPAs) negatively effects the present and the future growth of the banks and the economy. After reviewing all these studies the researcher that most of the studies have been focused on to find out the causes of emerging of non-performing Assets (NPAs) and how the banks manage the NPAs and provide suggestions in the form of some measure to be taken in micro level, that too specific to individual banks. And in some studies they compare the public and private banks. The NPAs is not only in Indian scenario but also exists in the foreign countries.

Therefore, the need of the study has been proposed to make a comparative analysis of the public sector, private sector and foreign banks operating in India with the regard to NPAs and analyze how to manage

the NPAs in terms of the operational performance of the banks by using Artificial Intelligence technics to effectively manage all the current issues revolving around recovery in stressed Assets and thereby help in reduction of NPAs across all banks and to know how AI and big data analysis technics resolve the issue of NPA Management.

OBJECTIVES OF THE STUDY:

These are the objectives which are to be considered for the study:

- To study the guidelines of RBI, Government and selected Indian & foreign Banks regarding Non-Performing Assets (NPAs).
- To examine the trend of Gross and Net Non-Performing Assets in the selected private sector, public sector and foreign Banks.
- To compare and analyze the level of Non-Performing Assets among the selected Banks.
- To examine Artificial Intelligence technique in controlling NPAs in Indian Banking sector.
- To analyze the impact of Non-Performing Assets on profitability of selected Banks.
- To prepare an action plan for controlling NPAs in Indian Banking sector.

RESEARCH HYPOTHESES:

1. H0: There is no significant difference of the Net & Gross NPAs in selected Private Sector Banks.
2. H0: There is no significant difference of the Net & Gross NPAs in selected Public Sector Banks.
3. H0: There is no significant difference of the Net & Gross NPAs in selected Foreign Banks.
4. H0: There is no significant difference of the NPAs in between the Public Sector Banks and Private Sector Banks.
5. H0: There is no significant difference of the NPAs in between the Private Sector Banks and Foreign banks.
6. H0: There is no significant difference of the NPAs in between the Public Sector Banks and Foreign banks.

RESEARCH METHODOLOGY:

Research methodology is the way where the research problem has been solve in the systematically manner. In this, the present section is committed to explain the methodology perpetrate to achieve this research work.

- **SAMPLE SIZE**: Forty Four banks will be selected for the research purpose which are as follows:

  Twelve from Public Sector banks,

  Six from private sector banks,

  Twenty six from foreign banks,

CRITERIA OF SAMPLE SIZE:

The selection of Bank is made on the basis of highest Net Worth of the Banks from 1st April 2016.

DURATION OF THE STUDY:

Six financial years will be taken into consideration commencing from financial year 2016-17 to 2021-22.

- **TYPE OF DATA**: For the purpose of study secondary data will be taken in to consideration:

  SECONDARY DATA:

  Present study will focus on data Annual reports will be collected from financial year 2016-17 to 2021-22.

- **SOURCE OF DATA**: Data will be collected from the website of selected banks

  Internet: There are different websites to collect the data which are follows:

  Government websites;

  Bank websites;

  Research gate website

  Journals:

  Journal of Management and Science

  International Journal of Management

  International Journal of World Research

  International Journal of Management Studies

TOOLS FOR ANALYSIS:

- **ACCOUNTING AND STATISTICAL TOOLS**: For analyzing the data, Ratio analysis and various descriptive statistical tools such as mean, median, standard deviation and test of significance such as ANOVA, z-test will be used.

  In addition to above stated statistical tool researcher may adopt other tools during the course of study.

- **TOOLS FOR PRESENTATION**: Researcher will use following presentation tools such as tables, charts, graphs etc.

TABLE-3 OBJECTIVE WISE RESEARCH METHODOLOGY

S.NO.	OBJECTIVE	RESEARCH METHODOLOGY
1	To study the policies guidelines of RBI , Government and selected Indian & foreign Banks regarding Non-Performing Assets(NPAs)	To accomplish this objective the researcher will study the different policies guidelines of RBI from master circulars, different government policies and the policies of the selected banks regarding Non-Performing Assets (NPAs).
2	To examine the trend of Gross and Net Non-Performing Assets in the selected private sector, public sector and foreign Banks.	To accomplish this objective the researcher will use annual report of the selected private sector, public sector and foreign banks to examine the trend of Gross and Net NPAs
3	To compare and analyze the level of Non-Performing Assets among the selected Banks.	To accomplish this objective the researcher will use the different financial ratios and different significant test to compare and analyze the level of NPAs among the selected banks.
4	To examine Artificial Intelligence technique in controlling NPAs in Indian Banking sector.	To accomplish this objective the researcher will study about artificial intelligence and big data analysis and use the various different techniques to control the NPAs of the selected banks.
5	To analyze the impact of Non-Performing Assets on profitability of selected Banks.	To accomplish this objective the researcher will use the hypothesis testing and through the different ratios which are framed to analyze the impact of NPAs on profitability of the selected banks.
6	To prepare an action plane for controlling NPAs in Indian Banking sector.	To accomplish this objective the researcher will use findings and conclusion of the above objectives.

TABLE-4 PROPOSED CHAPTER PLAN

CHAPTER NO.	CHAPTER NAME
1	Introduction
2	Review of literature
3	Policies of RBI, government and selected banks for Non-Performing Assets
4	Non-Performing Assets in Indian banking sectors / trend of Gross and Net Non-Performing Assets
5	Comparison and analysis of the level of Non-Performing Assets
6	Artificial intelligence in the data analysis and managing NPAs
7	Findings, Suggestions & Conclusions

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